RMRS
Rocky Mountain
Remediation Services, L.L.C.
. . . protecting the environment

RF/RMRS-97-035

Asbestos and Lead Sampling and Analysis Plan For The T891 Trailers

JULY 1997

ASBESTOS AND LEAD SAMPLING AND ANALYSIS PLAN

FOR THE T891 TRAILERS

REVISION 0

JUNE 1997

This Sampling and Analysis Plan has been reviewed and approved by:

John E. Law — 7/14/97

John Law, Manager, Water Management and Treatment — Date

M. Tyler Vess — 7-15-97

Ty Vess, Project Manager — Date

Ruth McCafferty — 7/14/97

Ruth McCafferty, Health and Safety Representative — Date

Greg D DiGregorio — 7/14/97

Greg DiGregorio, Quality Assurance — Date

This Sampling and Analysis Plan was prepared by:

Michael N. Schluterbusch — 7/16/97

Michael N. Schluterbusch, Certified Building Inspector — Date

TABLE OF CONTENTS

ACRONYMS

ACM	Asbestos containing material
AHERA	Asbestos Hazardous Emergency Response Act
AS	Absorption spectroscopy
CCR	Colorado Code of Regulations
CFR	Code of Federal Regulations
CPS	Coupled plasma spectroscopy
DQO	Data quality objectives
PEP	Project Execution Plan
EPA	Environmental Protection Agency
Ft^2	Square Feet
GF	Graphite furnace
HUD	Housing and Urban Development
IDL	Instrument detection limits
NVLAP	National Voluntary Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PLM	Polarized light microscopy
PPE	Personal Protective Equipment
PPM	Parts per million
RCT	Radiation Control Technician
RFETS	Rocky Flats Environmental Technology Site
RTG	Resource Technology Group, Inc.

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this project is to remove four office trailers and one semi-trailer from the Rocky Flats Environmental Technology Site (RFETS). The work is to be implemented and completed within the FY97 budget cycle.

Trailers T891A, L, M and N are portable office trailers, each measuring 10 feet wide by 60 feet in length. Construction materials and methods for these trailers are similar to that found in mobile homes. Trailer T900E is a semi trailer constructed of all new materials. A letter from the Resource Technology Group, Inc. (RTG) stated that no asbestos or lead containing materials were used, exempting this unit from further testing and analysis. For details regarding building descriptions and histories, refer to the Project Execution Plan (PEP).

1.2 SCOPE

The scope of work includes the completion of all activities required to remove five trailers in the T891 Cluster. This includes planning and engineering, facility assessments, regulatory activities, characterization of building contaminants, and site preparation. The scope also includes the procurement activities to identify and put subcontract(s) in place to perform utilities disconnections and for transportation of the trailers.

1.3 PROTOCOL

Contained herein is a preliminary protocol for asbestos and lead sampling for the T891 Trailer Cluster. Due to the analytical methodology, other metals such as arsenic, chromium, cadmium and zinc may be discovered and documented. This approach will ensure that the process will be in compliance with applicable Federal and State regulations.

The survey practices outlined are specifically designed to provide occupational hazard assessment information in support of activities to facilitate removal of Trailers T891A, T89IL, T891M, T891N And T900E from the site. However, the information may be used to provide support for a comprehensive operations and maintenance program during normal building activities covered under the site Integrated Work Control Program such as routine or scheduled maintenance, repair or remodelling until such time as the trailers are evacuated and moved.

All decisions and processes are checked for veracity through the use of the site data quality objectives process guidelines (EPA QA/G-4).

2.0 METHODOLOGY

The first step in sampling for asbestos and lead in a building is to research the building records such as blueprints and specifications for documentation of the use of these materials in construction or remodelling efforts. Dates of construction are considered in this process.

The second step in this process is to physically tour the building, entering every accessible area and room, looking for suspect (or affected) materials that may indicate through historical data or based on the inspector's experience, the presence of asbestos or lead. A suspect list is generated, along with estimated quantities.

2.1 INSPECTION RATIONALE

Settled dust sampling for lead and asbestos is used as an optional aid to assessment of industrial hygiene issues such as work practices and engineering controls and Personal Protective Equipment (PPE) that would be used in the decommissioning, removal or demolition of structures.

Bulk asbestos and/or paint chip sampling for lead is used as an aid to assessment of industrial hygiene issues such as work practices and engineering controls and PPE.

Asbestos and lead sampling is a destructive method that may release a small quantity of dust. Although material and paint chip samples are to be collected from inconspicuous areas, proper safety precautions must be taken to prevent the spread of suspect materials.

When inspecting for asbestos, non-suspect (or unaffected) materials are those traditionally made of wood, glass or metal. However, the inspector will suspect the adhesives applied to secure non-suspect materials to the substrate. Suspect, or affected materials are separated into three general categories: thermal systems insulation, surfacing materials, and miscellaneous materials.

When inspecting for lead, there are components where it has been identified through historical research of building records or by visual inspection techniques that lead paint and/or the aforementioned metals either in paint, chips, fragments, dust or material forms have been positively identified as existing. The following is a list of materials that may be coated with lead containing paint, or may have been constructed with lead.

- Wall and ceiling paint
- Paint on components (i.e, guard rails, tanks, machine guards)
- Gloveboxes and associated shielding equipment
- Piping
- Roof jacks
- Mounting plates and bracket bars
- Stationary shields
- Lead fill in walls
- Plaster additives

Non-suspect areas are those areas where there is a high level of certainty that lead and/or the aforementioned metals do not exist due to the absence of either in paint, chips, dust, fragments or material forms.

Before any removal, decommissioning or destruct activities are allowed, suspect and non suspect areas will be evaluated to determine sampling criteria needs. See Table 2-1 for evaluations on this project.

TABLE 2-1 LEAD AND ASBESTOS SURVEY RESULTS/SAMPLING REQUIREMENTS

TRAILER	LEAD SAMPLES	ASBESTOS	NOTES
T891A	Exterior: (1 each) 1. Sheet metal 2. Skirting 3. Base trim 4. Roof trim	Exterior: (1 sample each) 1. Pipe insulation 2. Roof tar	PU&D# 00088246
	Interior: 1. Ceiling panels (1 sample)	Interior: 1. Floor tile (6 samples) 2. Ceiling panel (3 samples) 3. Ceiling insulation (3 samples)	From previously acquired samples.
T891L	Exterior: (1 sample) 1. Sheet metal 2. Skirting 3. Base trim	Exterior: 1. Roofing tar (1 sample)	Elder S# C18357; Built 1981: PU&D#085344-00
	Interior: (1 sample) 1. Roof panels	Interior: (1 sample each) 1. Floor tile 2. Pipe insulation 3. Ceiling panel	
T891M	Exterior: (1 sample) 1. Sheet Metal 2. Skirting 3. Base trim	Interior: 1. Roof tar (1 sample)	Elder S#PT9365; PU&D#0095343-00; Built 1981
	Interior: (1 sample) 1. Ceiling panels	Interior: (1 sample each) 1. Floor tile 2. Pipe insulation 3. Ceiling panel	
T891N	Exterior: (1 sample) 1. Sheet metal 2. Skirting 3. Base trim	Exterior: 1. Roof tar (1 sample)	PU&D# 00079991-00
	Interior: (1 sample) 1. Ceiling panels	Interior: (1 sample each) 1. Floor tile 2. Pipe insulation 3. Ceiling panel	
T900E	Interior & Exterior: Exempt	Interior & Exterior: Exempt	RTG letter dated 4/24/97 exempts from sampling
TOTALS	18 Samples	27 Samples	

2.2 DATA COMPILATION

Data compilation will separate the materials into homogeneous areas within these general categories, which will lead to the number of samples necessary for regulatory compliance and statistical reliability of the outcome. Any homogeneous area may be assumed to contain asbestos or lead, negating the need for samples. Each building in the T891 cluster is sampled as a single entity.

3.0 SURVEY PROCEDURES

3.1 SAMPLE QUANTITY

The number of samples for asbestos for each homogeneous area is outlined in EPA 40CFR 763.86. Sample quantity is decided first by a material's physical condition of friability, then by its general category. Friable materials are those that are capable of being crumbled or reduced to powder by hand pressure. Thermal systems insulation, such as that found on pipes or ducts, friable or non-friable, requires a minimum of three samples per homogeneous area, one sample from patches less than six linear or square feet, and one from cementitious or "mudded" fittings. Each mechanical system, such as hot and cold domestic water, may have several homogeneous areas. Each will be sampled accordingly. Only friable surfacing materials, such as fire-proofing or ceiling texture, will have a nine section grid applied to a blueprint of the area and samples will be acquired from the center of randomly selected grids. If the homogeneous area of friable surfacing material is less than 1,000 ft^2, three samples are needed; if between 1,000 and 5,000 ft^2, five samples are needed; if the area is over 5,000 ft^2, seven samples are needed. Miscellaneous materials, such as floor and ceiling tiles are sampled according to the inspector's discretion, as outlined in EPA 40CFR 763.86(c&d). For the purpose of this survey and based on the inspector's experience and discretion, a minimum of one sample of each suspected material in this category will be acquired.

Lead in paint sample quantity is outlined in the 1995 HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing. Samples are determined by the colors present in the structure. Each color is sampled accordingly. Similar colors may also be sub-categorized into the type, such as oil-based, latex, gloss or semi-gloss for example. For each homogeneous area, one representative sample is acquired. Multiple layers of different colors are so noted if this can be determined visually. If not, the top layer is the determining color. The inspector also notes the substrate material.

3.2 SAMPLE LOCATION

Sample locations are selected randomly according to how each represents a homogeneous material. Since homogeneous areas are located throughout the building, the representation and number of samples is the driving factor rather than exact location of the sample in each room. Exact locations will be directly affected by the radiological concerns. In the absence of radiological surveys, a radiological control technician (RCT) will accompany the inspector. If a selected location is determined to exceed acceptable parameters, a second location will be selected. Should no radiologically acceptable location be found, a contaminated sample will be acquired and treated as a radiologically contaminated sample and cleared through Radiological Operations and Engineering.

4.0 SAMPLING

4.1 SETTLED DUST

Settled dust on horizontal surfaces will be sampled using a micro-vac technique that requires the use of a template that sequesters a 10 square inch pattern. The sampling tool is a low volume battery powered air sampling pump calibrated at 21 parts per million (ppm) with a 25 mm mce cassette attached. A two inch section of tygon tubing is attached to the upstream side of the cassette and facilitates pickup of all loose dust in the grid area. Each sample is documented as to location, the cassette is labeled with an identifying number, and sealed. The sample number is documented on the chain of custody form. The sample location may be photographed with a sample photo identification card in the focus area documenting the sample number and date, and orienting the viewer to the sample location with an arrow.

Each sample will be acquired with the intent of assuring the quality, representation, and safety of the process. The following steps will be performed for each sample acquired. Note that a RCT may be present as necessary to survey the area and location of the sample prior to proceeding.

4.2 ASBESTOS AND LEAD

Sampling for asbestos is performed using destructive techniques that requires acquiring a representative sample of the material down to the substrate. Each sample must contain a minimum of one cubic centimeter of material to facilitate analysis and archival processes.

Sampling for lead in paint requires that the paint chip sample be four square inches in size. Minimum weight is .2 grams. Sample size will be adjusted accordingly. The most common paint sampling method is to scrape paint directly off the substrate. The goal is to remove all layers of paint equally, but none of the substrate.

Sampling for lead and metals will be primarily performed utilizing a dust sampling technique and/or paint scraping techniques. Each sample will be acquired with the intent of assuring the quality, representation and safety of the process.

Bulk sampling procedures as outlined:

- The location of the sample is visually verified against written descriptions.
- A polyethylene drop cloth or plastic bag placed below the elevated sample areas.
- The immediate sample area is dampened with a mist of water and surfactant.
- A sampling tool, such as a hammer and chisel, razor knife, "wondermaker" or hole saw is selected and the sample is acquired, making sure to take a complete sample to the substrate. During this process, the immediate surface is misted as necessary.
- The acquired sample is placed in a sealable container, such as a plastic bag or vial.
- The container is sealed and a pre-numbered label is placed on the container. The sample number label is placed on chain of custody papers and the container is verified to be sealed.
- The sampling tool is thoroughly cleaned using mister and wipes as per AHERA.

- The sample area is patched as needed.
- The description and location is documented on a form, a sample label is placed on the form, and the location is documented on a blueprint.
- The sample container, drop cloth and immediate sample area is wet wiped and the drop cloth is carefully folded in to the center and placed in a sealable bag and the bag is sealed.
- In the case of routine maintenance areas, a pre-numbered label is placed at the sample location. With permission of the building manager, labels will be placed on all sample locations.
- The sample location is photographed with a sample photo identification card in the focus area documenting the sample number and date, and orienting the viewer to the location with an arrow. As there are no regulatory drivers in place for photographing lead in paint samples , this step is optional for this process.
- All used wipes, drop cloths, and PPE will be added to the appropriate waste stream.

5.0 LAB SUBMISSION ANALYSIS AND INSTRUMENTATION

All samples shall be submitted to a laboratory recognized by the EPA National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos. Appropriate sample submittal forms shall be used. The field sample number shall appear on the field sampling form, the laboratory submittal form, and the container label. The name of the laboratory, the date the samples were sent to the lab, and all personnel handling the sample from the time of collection to the time of arrival at the laboratory shall be recorded on a chain of custody form.

5.1 ASBESTOS

The analytical methodology for bulk asbestos samples is polarized light microscopy (PLM) capable of 400x magnification augmented with dispersion staining. This method is outlined in the EPA 600/R-93/116 methods for the determination of asbestos in building materials.

Bulk samples of suspect materials are examined for homogeneity, layers and preliminary fiber identification using a stereoscope at 40x magnification. Layers are separated and mounted on slides. Refractive index oils are applied to the slide according to a morphology match. A light microscope equipped with two polarizing filters is used to observe seven specific optical characteristics of a sample at 400x magnification. The presence or absence of the characteristics determines the type of asbestos, or if not asbestos, the type of fiber present in the sample. The microscopist then visually estimates the percentage of asbestos or non-asbestos fibers in that layer. Each layer is reported separately. A layer or sample is determined to be an asbestos containing material if it contains more than one percent asbestos by this estimate. The limit of detection for PLM is less than five microns.

CCR 8 (Section iii.B.6.ii) mandates that the building manager must be given the option of accepting results from PLM analysis of samples with asbestos percentages from trace (less than 1%) to 10%, or requesting point counting analysis. If point counting is chosen, these results take precedence over the plm results. Point counting is a methodology that uses identical instrumentation, with the addition of a grid system on the stage. The analyst is required to look at

a minimum of 100 locations on eight different mounts, estimate the percentage of asbestos, and add these percentages for a statistical representation of the content.

5.2 LEAD

EPA SW-846 determines details and methods for the determination of metals in solids, including lead, cadmium, chromium, zinc and arsenic.

Solid samples are homogenized, weighed and digested in nitric acid. This digestate is brought to a known volume and analyzed for various metals using atomic absorption spectroscopy (AS), Graphite furnace (GF) or inductively coupled plasma spectroscopy (CPS). The instrument detection limits (IDL) for lead and metals are both 0.25 ug/ml with the actual sample detection limit dependent on the sample size and volume.

The result is then compared to the standard for lead-based (or other metals) paint divided by the number of sub-samples (the composite standard). If the result is above this number, one or more of the samples may be above the standard. Each sub-sample is reanalyzed. If the result is below this number, none of the sub-samples can contain lead above the standard. If both single-surface and composite samples are collected side-by-side, the individual samples can be submitted for analysis without returning to the building if the composite result is above the composite standard. If the laboratory does not analyze the entire composite sample, it must use a validated homogenizing technique to ensure that all sub-samples are completely mixed together.

6.0 DATA ANALYSIS

Two types of data are generated during an asbestos and/or lead in paint building inspection; the field data and the laboratory data. The field data consists of research on the building history, observation and identification of installed building materials, and measurements to determine quantities. The laboratory data consists of empirical observation through instrumentation, identification and quantification of sample information.

6.1 HISTORICAL RESEARCH

The historical research allows the inspector to compile information that is used to discover and verify the existence of asbestos or lead in building materials. Maintenance and asbestos abatement records, blueprints, as-builts, specifications and emergency response documents are examples of the data used. Once the inspector arrives at the site, the visual inspection begins, usually at the basement level and proceeding throughout the building and ending up on the roof. The inspector is looking for suspect materials and damage to same. This information will be used later to provide a physical assessment of the materials found.

6.2 LABORATORY

The laboratory data is reported, usually in tabular format, to the inspector. In the table, the inspector finds information on the fibrous and non-fibrous constituents in the sample, reported as percentages of the total material. If asbestos is discovered, the table will describe the geologic type (such as chrysotile) and which layer it was discovered in. Other common fibrous constituents are fiber glass, rock wool and nylon.

The historical research allows the inspector to compile information that is used to discover and verify the existence of various metals in the building and facility components. Maintenance, renovation, and abatement records, along with blueprints, as-builts and specifications are examples of documents reviewed for this purpose. Once the inspector arrives at the site, the physical inspection begins, usually at the lowest level of the structure and ending up on the roof. The inspector is looking for suspect materials and verifying the existence of materials discovered during the historical research.

In the case of lead in paint, the lab data is usually reported in tabular form to the inspector. In the table, the inspector will find information on the percentage or portion per sample that contains the suspect metal. Should the sample not contain any suspected metals. This information will be included in the report.

7.0 SUMMARY

The inspector compiles the field and lab data, cross-matches information, eliminates non-asbestos and/or lead containing materials from the suspect list, and generates a report on the findings. The report consists of an executive summary, location and description of both asbestos and non-asbestos, and/or lead (metals) containing building materials either sampled or assumed, estimated quantities of same, physical assessment of the friable asbestos containing materials, location of samples acquired, photographs of sample locations and damaged materials, and blueprints indicating sample locations and homogeneous areas that contain asbestos and/or lead.

8.0 QUALITY ASSURANCE

Quality assurance for the asbestos and lead characterization of the T891 Trailer Cluster begins by assessing the procedure through the data quality objectives (DQO) process document. The veracity of the methodology also requires that data acquired during the inspection process be checked.

THE EPA QA/G-4 process begins with a statement of the problem, which is outlined in Section 1.0. Step two, identify the decision, is covered in Section 2.0. Steps 3, 4, 5, and 6 are driven by aforementioned regulatory requirements or guidelines. The expert and diverse rationale used to develop these parameters are sufficient to preclude evaluation or selection of any alternatives. The methodologies inherent in these procedures have been accepted industry standards and tested in courts of law and need only to be applied on a site specific basis with the input from qualified individuals.

Both the field and laboratory data are verified for accuracy and consistency. Each sample location is verified for representative quality and the sampler verifies that the sample size or volume meets the analytical requirements, and that the sample includes depth to substrate. Sample numbers are continually cross-checked to avoid redundancy or omissions. Administrative and engineering controls are used in this process. Administrative controls include the mandate that all inspectors and lab analysts meet all applicable regulatory training certification and licensing requirements.

8.1 FIELD DATA

In the field, the inspector acquires quality control (or duplicate) samples at the rate of five percent. Sample locations are chosen randomly and a second sample is acquired at the same location. This sample is sent to the same lab for analysis. Should discrepancies occur, the issue is resolved by retracing the steps back to the sample acquisition point and following the process back to the lab. If the issue is still unresolved, the inspector will acquire an additional sample to be sent to a different lab. In addition to APO is required to validate laboratory data at the rate of 25%.

8.2 LAB DATA

In the lab, the analyst uses the same five percent criteria in performing quality control procedures for asbestos as outlined in the NVLAP program. Samples are randomly chosen and another analyst re-assesses the sample. Results are compared, and discrepancies are resolved. All mathematical calculations are verified through peer review.

For lead samples in the lab, the analyst is bound by protocol for quality assurance outlined in EPA SW-846 and requirements set out by the National Lead Laboratory Accreditation Program. All laboratory calculations are verified through peer review.

8.3 COMPARISON/MATCHING

A last step in quality assurance involves the comparison of field and lab data. The sample numbers and descriptions are checked against each other to verify that the lab saw the same material as the inspector. Problems may occur due to transposition of number sequences, and this is resolved by checking the field data sheets against the chain of custody and the lab report. Minor differences in the physical descriptions are allowed due to the fact that lighting in the building may be different than that in the lab. Major differences in descriptions are often traced back to the number transposition issue. In order to avoid this issue, inspectors will use pre-printed labels on the field data sheet, sample container, and chain of custody document.

8.4 PEER REVIEW

Finally, the report itself is passed through peer review. This process assures the final product will be free of technical, grammatical, and mechanical errors prior to being passed on to the client or being used as a basis for future operations in the building such as abatement, maintenance, renovation, or demolition.

9.0 REFERENCES

EPA 40 CFR 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, October 30, 1986

OSHA 29 CFR 1926.1101, Asbestos Construction Standard , August 10, 1994

Emission Standards for Asbestos, Excerpted from Colorado Regulation No. 8, "The Control of Hazardous Air Pollutants", Part B, Emission Standards for Asbestos, November 30, 1996

EPA Method SW 846-3050A/7420, Atomic Absorption Spectrometry

OSHA 29 CFR 1926.32, Lead Exposure in Construction, Interim Final Rule, June 1989

HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, June, 1995.

EPA QA/G-4 The Data Quality Objectives Process, Quality Assurance Management Staff, Draft Final, March 3, 1994.